Honeywell

Honeywell Model 700/800 Signal Processor and Viewing Head

USER MANUAL

APPLICATION

The Honeywell Model 700ACSP and Model 700DCSP signal processors are single-channel, fail safe, flame monitoring systems when used In conjunction with the S70X/S80X viewing heads. They offer easy setup, excellent discrimination, and high reliability.

FEATURES

Viewing heads are interchangeable between the two signal processor models. Any viewing head in the two families will work with any of the signal processors.

Two signal processor models are available:

- Model 700ACSP Universal 85-265 VAC powered, plus 24VDC backup.
- Model 700DCSP 22-26VDC powered, plus 24VDC backup.

The two Model 700 signal processors are similar, with 12 push-buttons, a two-digit numeric display, and four LED status indicators for operator interface. The only difference between the two is that one accepts AC power and the other accepts DC power. Both models also accept 24VDC backup power. Most of the signal processor connections are made through Phoenix plug-in connectors. Communication connections are made through modular phone jacks located at the top of the signal processors (Fig. 8).

Both signal processor models mount on a standard 35 mm DIN rail. They snap into place and may be released from the rail using a flat screwdriver.

There are two types of viewing heads—IR/flicker-sensitive and UV-sensitive—with various features offered resulting in ten different models. See Table 1 on page 2 for details.

The S702 and S706 viewing head housings are larger in diameter than the S80X series, are made of aluminum, and are secured with over-center latches to their mounting blocks (Fig. 9). In contrast, the S802 and S806 viewing head housings are smaller in diameter and are made of stainless steel (Fig. 10). An 800 series viewing head is secured in its mounting block by a friction twist-lock.

The IR/flicker sensitive viewing heads have a high-pass filter that passes flicker frequencies above 33 Hz. Some models have a built-in high pass filter that only passes frequencies above 155 Hz. The high frequency filter models are identified by adding “HF” to the model number. The UV models respond to the level of UV radiation—not UV flicker—so there is no filter option.

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Table 1. Available viewing head models and associated features.

Model	Connector	Pipe Fit Connection 0.5 in. NPTM with 50-ft (15.2 m) pigtail	UVTron Sensor	IR Sensor	High Frequency Filter 155Hz	Aluminum Housing	Stainless Steel Housing
S702	X			X		X	
S702HF	X			X	X	X	
S702PF		X		X		X	
S702HFPF		X		X	X	X	
S706	X		X			X	
S706PF		X	X			X	
S802	X			X			X
S802HF	X			X	X		X
S806	X		X				X

1. All models include Electronic self-check.
2. Flicker Frequency filter settings available for IR sensor models.
3. Gain Selection available through Signal Processor.

The viewing heads, the viewing head connector, and the cable provided are watertight, and have NEMA 4X ratings when the connector is properly tightened with pliers and the cable is protected from UV exposure.

The availability of both UV-sensing and IR/flicker-sensing viewing heads ensures that the flame monitoring systems can provide good discrimination in most single and some multiple burners firing a single fuel. UV sensing is appropriate for monitoring natural gas, some mixed gases and light oil flames. IR/ flicker sensing is appropriate for monitoring heavy oil and coal flames.

SPECIFICATIONS

Series 700 and 800 Viewing Heads

MODELS S702, S702PF, S702HF, S702HFPF, S706, S706PF, AND MODELS S802, S802HF, AND S806

Electrical
24VDC Power is supplied by Signal Processor

Environmental
Viewing Head Sealing: NEMA TYPE 4X rated when the molded connector ring is tightened with pliers and a UV protection is provided for the cable by installing in conduit.
Ambient Temperature: -40°F to 185°F (-40°C to 85°C)

IR Detector Spec
S702, S702PF, S702HF, S702HFPF, S802, S802HF: Germanium photodiode with spectral response 950nm to 1710nm (1/2 intensity points) and peak spectral response at 1400nm
High Pass Filter Pickup: 33 Hz standard, 155 Hz high frequency option (-HF)

IR Optical
Angle of View: 1 degree (1.45 in. dia. at 6 ft. or 3.7 cm dia. at 1.8 m)

UV Detector Spec
S706 & S706PF, S806: UVtron with spectral response 185nm to 260nm and a peak response at 210nm

UV Optical
Angle of View: 5 degrees (1 inch per foot)

Cable & Connectors - S70X/S80X Viewing Heads
New installations - highest level of EMI shielding available:
ASY785 --> 50 foot C330S cable with pre-wired ASY786 connector.
ASY785-200 --> 200 foot C330S cable with pre-wired ASY786 connector.
ASY786 --> Field wireable connector with shield.

Dimensions
Refer to Fig. 9 and Fig. 10.

Model 700ACSP & Model 700DCSP Signal Processer

Electrical: Model 700ACSP
Primary Input Power: 85-265VAC, 50-60 HZ, 0.07A Max. fused (with either V.H. connected)
Battery Backup Voltage: 22VDC to 26VDC, 0.2A DC Max. fused (with either V.H. connected)

Electrical: Model 700DCSP
Primary Input Power: 22VDC to 26VDC, 250 mA Max. fused (with either V.H. connected)
Battery Backup Voltage: 22VDC to 26VDC, 0.5A DC Max., fused (with either V.H. connected)

Outputs
Flame Relay: 2 form C contacts
Self-Checking Relay: 1 form C contact
Relay Contact Ratings: 5A at 125 VAC, 277 VAC, & 30 VDC; 1/8 HP 125 & 250 VAC
Analog Flame Signal: Isolated 0 to 20 mA or 4 to 20 mA output for remote meters or DCS, 360 ohms maximum resistance

Environmental
Ambient Temperature: 32°F to 140°F (0°C to 60°C)

Dimensions
Refer to Fig. 11 and Fig. 12.

APPROVALS

S70X/S80X Viewing Heads (Connector series and Pipe fit series [PF])
CSA for CLASS I, DIV 2, GROUPS A, B, C, D & T4A
FM 7610/NEMA 4X and CLASS 1, DIV 2, GROUPS A, B, C, D & T4A*
SIL 3 “Fit for Use”
IECEx CSA 10.0003 Ex nA IIC T4 Gc
-40<Ta<85ºC, -40<TA<185ºF

*IP67/NEMA 4/4X rating applies when connector ring is properly tightened and cable is UV shielded

700ACSP and 700DCSP Signal Processors
CSA (C, US)
FM

INSTALLATION

When Installing These Products...

1. Read these instructions carefully. Failure to follow them could damage the products or cause a hazardous condition.
2. Check the ratings given in the instructions and one the products to make sure the products are suitable for your application.
3. Installer must be a trained, experienced, flame safeguard control technician.
4. After installation is complete, check out product operation as provided in these instructions.

Signal Processor Mounting

The 700ACSP and 700DCSP signal processors mount on a standard 35mm DIN rail. They snap into place and may be released from the rail using a flat screwdriver.

Grounding and Shielding

NOTE: Installer must be a trained, experienced flame safeguard service technician and should be familiar with the equipment operation and limitations and be aware of any applicable local codes and regulations.

1. Connect a safety ground to the viewing head housing (if applicable). A ground screw is provided on the exterior of the viewing head housing for this purpose.

⚠ WARNING
The viewing head housing is grounded through cable/signal processor, so you must ensure that AC/DC potentials at ground of signal processor and viewing head are the same, or damage to the cable or signal processor can result.

2. The viewing head and all associated cable/conduit must be at least 12 inches (31 cm) from any source of high energy or voltage (for example, igniter equipment).
3. Install a ground wire from the ignition transformer case to the igniter assembly.
4. Ensure all igniter wires and cables show no signs of wear. Replace any igniter cables or wires that are frayed or cracked.
5. The viewing head must be electrically isolated from the burner front.
   a. Electrical isolation can be accomplished by installing an Ultem nipple (R-518-13) or an Ultem locking coupler adapter (R-518-PT13 or R-518-PT13L) in conjunction with a locking coupler (R-518-CL13-HTG) between the viewing head flange and the burner mount.
   b. The purge air line should also be isolated from the viewing head. This can be accomplished by installing any insulating material, for example a rubber hose, in between the purge air line and the viewing head.

Signal Processor Power Connections

The Model 700ACSP power and relay connections are shown in Fig. 1. The AC power supply to the 700ACSP Signal Processor passes through a 2A fuse and an inrush current limiter.

The Model 700DCSP power and relay connections are shown in Fig. 2. The maximum current requirement for each 700DCSP is 250mA.

In the Model 700 signal processors the flame relay (RF A/B ON, OFF, COM) has two sets of FORM C (SPDT) contacts and the self-check relay (SC ON, OFF, COM) has one set (Fig. 1 and Fig. 2). The self-check relay is energized whenever the signal processor is powered and is operating normally, whether the flame relay is energized or not. Internally, the flame relay is wired in series with the self-check relay (not shown), which prevents the flame relay from energizing if the self-check relay is not energized.

Unique fail-safe circuitry for the self-check and flame relays ensure that in the event of any critical component failure occurrence, system response will be to de-energize the self-check relay, which in turn de-energizes the flame relay.

Some of the internal power wiring of the Model 700ACSP and Model 700DCSP signal processors is shown in Fig. 1 and Fig. 2. Rectifier diodes separate the battery backup input from the main power bus until the battery voltage exceeds the internal DC voltage plus a diode voltage drop. Resettable fuses (shown as resistors with slashes) and conventional fuses prevent internal failures from loading the power sources. With the Model 700DCSP, if a backup battery is to be used with a main power supply, the two power sources would be wired as shown in Fig. 2. If no backup battery is to be installed, the main power supply can be connected at +26V PWR and GND as shown in Fig. 2 or it can be connected to the +24V BATT input and GND. It is preferable to use the battery connections because it takes advantage of the resettable fuse at the battery input; resettable fuses recover automatically from a fault within a few seconds after power is removed. At the +26V PWR input and its associated GND, conventional1A fuses are used because they are able to protect against 240VAC being applied by accident (this could happen if a Model 700DCSP is installed in a cabinet wired for a Model 700ACSP).

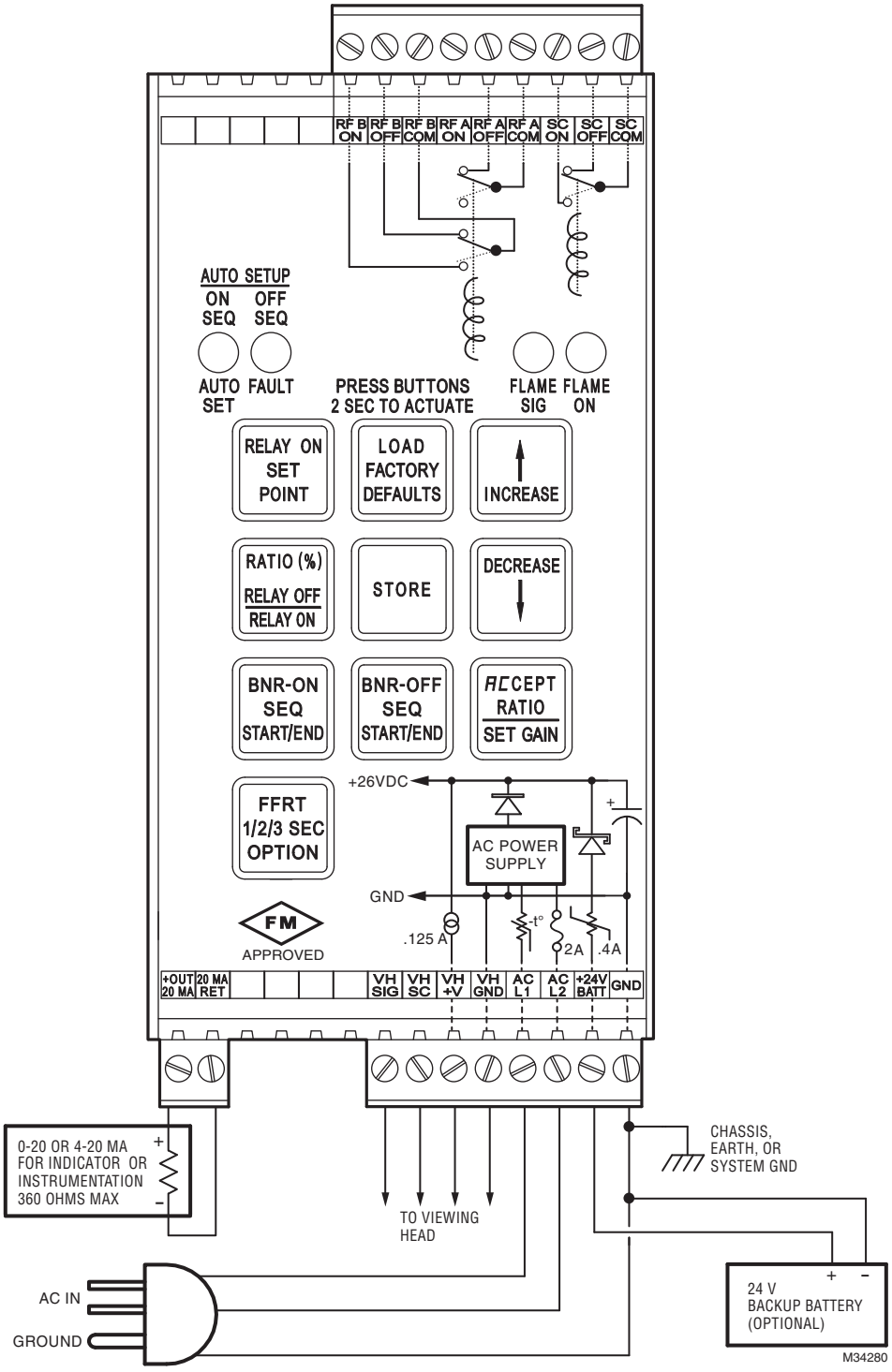

Fig. 1. Model 700ACSP Signal Processor Wiring.

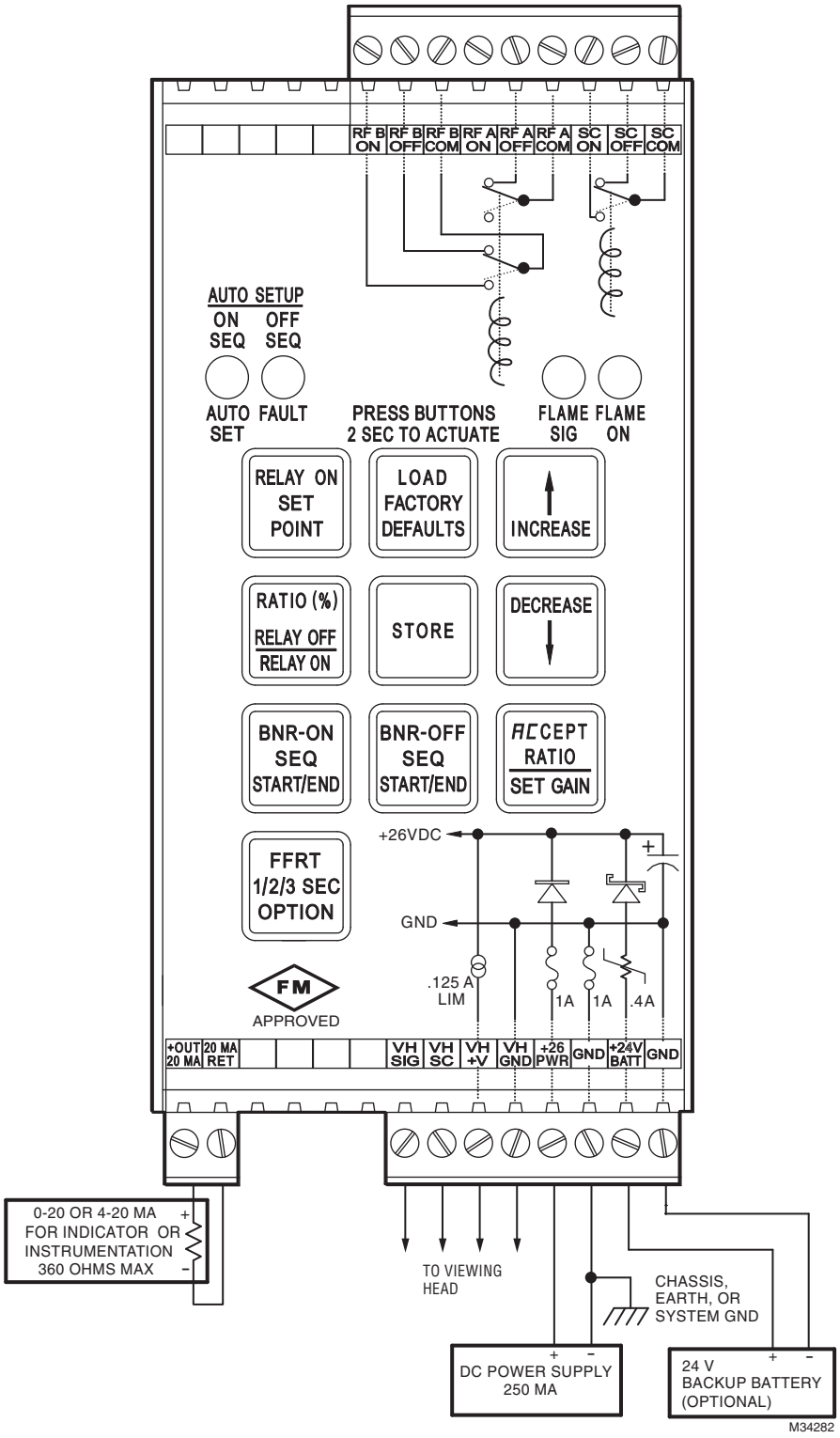

Fig. 2. Model 700DCSP Signal Processor Wiring.

Viewing Head Connector and Wiring

Viewing heads are wired to the appropriate terminals located on bottom of the 700ACSP, 700DCSP, P531 or P532 signal processors. The terminals are listed functionally in Table 2.

Table 2. Terminal Descriptions.

700ACSP or 700DCSP Terminal	P531 or P532 Terminal	Description
VH SIG	VH3 SIG	Flame Signal from Viewing Head
VH SC	VH3 SC	Shutter Drive Signal to Viewing Head
VH +V	VH3 +V	+24VDC Power to Viewing Head
VH GND	VH3 GND	GND Signal Ground

Connectors and cables are shown in Fig. 3, Fig. 4, and Fig. 5. Fig. 3 shows the viewing head cable with the 1/2 in. NPT pipe fitting and pigtail for use in a conduit. The PF model comes with 50 feet of Honeywell C330S cable. This cable is recommended for all new installations. It has ITC and CIC ratings for hazardous location. Figs. 4 and 5 describe the C330S cable used with the right angle field-wireable connector. Refer to “Accessories” on page 9 for part numbers.

The customer may also supply his own cable; a replacement mating viewing head connector should be ordered. Refer to “Accessories” on page 9 for part numbers. The use of 22g, 4-conductor cable with shield and drain is recommended. The shield should be foil and braid type surrounding all conductors. The shield should be connected to GND at the processor end. The cable diameter should not exceed 0.307" in order for it to go through the hex bushing in the connector. But note that wiring the cable to the connector is not easy because of the limited space. Also, the LED indicator assembly must be mounted inside the connector and, preferably, soldered in place. Thus, it is recommended to purchase a pre-wired cable and connector assembly from Honeywell.

NOTE: FOR CLASS I, DIV 2 RATING, CABLING IN HAZARDOUS LOCATIONS MUST COMPLY WITH NEC ARTICLE 500 REQUIREMENTS AND APPLICABLE GOVERNING CODES.

In the U.S., cables should have UL’s ITC rating; in Canada, cables should have CSA’s CIC rating. The recommended C330S cable has both ratings.

NOTE: To obtain a NEMA 4X seal between the connector and the viewing head, tighten the metal connector ring securely.

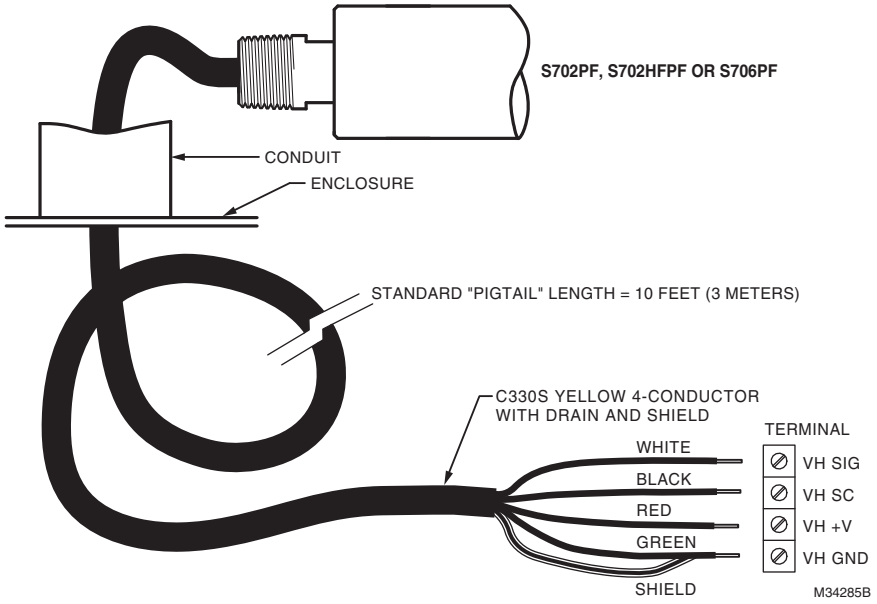

Fig. 3. Model 700 Viewing Head Cable With 1/2 in. NPT Fitting.